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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,191	09/30/2003	Seiji Horii	60188-669	1264

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EXAMINER
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PHAN, RAYMOND NGAN

ART UNIT	PAPER NUMBER
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2111

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/673,191

Applicant(s)

HORII ET AL.

Examiner

Raymond Phan

Art Unit

2111

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 23 is/are rejected.
- 7) ☒ Claim(s) 19-22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 09302003.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

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### **PART III DETAILED ACTION**

#### ***Notice to Applicant(s)***

1. This application has been examined. Claims 1-23 are pending.
2. The Group and/or Art Unit location of your application in the PTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Group Art Unit 2111.

#### ***Specification***

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-18, 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shinohara et al. (US NO. 6,321,284) in view of Satoh et al. (US No. 5,640,600).

In regard to claims 1, 6, Shinohara et al. disclose a resource management device in a data processing system, in which at least one bus master is connected to each of a plurality of buses, with each bus master being connected to at least one shared resource via one of the plurality of buses, the resource management device (see figure 1) comprising: a bus arbitration section for arbitrating an amount of access to be made from the plurality of buses to the shared resource (see col. 3, lines 14-65). But Shinohara et al. do not specifically disclose an arbitration

information management section for managing, as bus arbitration information, a bus priority order and a highest access priority pattern for ensuring a predetermined access bandwidth to the shared resource for each of the plurality of buses for an arbitration operation by the bus arbitration section; and a resource control section for controlling, based on characteristics of the shared resource, an access to the shared resource from the bus whose access request has been granted by the bus arbitration section. However Satoh et al. disclose an arbitration information management section for managing, as bus arbitration information, a bus priority order and a highest access priority pattern for ensuring a predetermined access bandwidth to the shared resource for each of the plurality of buses for an arbitration operation by the bus arbitration section (see col. 6, line 52 through col. 7, line 15); and a resource control section for controlling, based on characteristics of the shared resource, an access to the shared resource from the bus whose access request has been granted by the bus arbitration section (see col. 7, lines 23-61). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

In regard to claim 2, Satoh et al. disclose wherein the resource control section includes: an access control section for analyzing a data transfer protocol of the bus whose access request has been granted by the bus arbitration section and for controlling a data transfer operation between the bus and the shared resource based on the analysis; and a buffer memory for temporarily storing data to be transferred to or from the shared resource (see col. 9, line 57 through col. 10, line 56). Therefore, it would have been obvious to a person of an ordinary skill in the

art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

In regard to claims 3, 17, Satoh et al. disclose wherein the arbitration information management section has a function of updating at least one of the bus priority order and the highest access priority pattern of the bus arbitration information (see col. 9, line 57 through col. 10, line 56). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

In regard to claim 4, Satoh et al. disclose wherein the bus arbitration information is arranged so that different types of access to the shared resource are distinguished from one another (see col. 9, line 57 through col. 10, line 56). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

In regard to claims 5, 23, Shinohara et al. disclose wherein the bus master connected to one of the plurality of buses has a structure in which at least one upper bus master is connected to each of a plurality of upper busses (see figure 1).

In regard to claims 7, 13-14, Satoh et al. disclose wherein the arbitration information management section further has a function of managing the bus master arbitration information and the bus arbitration information so as to reflect the requested access bandwidth to the shared resource for each of the bus masters (see

col. 9, line 57 through col. 10, line 56). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

In regard to claim 8, Shinohara et al. disclose wherein each bus master or each bus is assigned a highest priority order at regular intervals by the highest access priority pattern (see col. 3, lines 14-65).

In regard to claim 9, Shinohara et al. disclose wherein each bus master or each bus is assigned a highest priority order consecutively by the highest access priority pattern (see col. 4, line 35 through col. 5, line 15).

In regard to claim 10, Shinohara et al. disclose wherein each bus master or each bus is assigned a highest priority order randomly by the highest access priority pattern (see col. 4, line 35 through col. 5, line 15).

In regard to claim 11, Shinohara et al. disclose wherein: there is at least one group in which one or more of the bus masters operate cooperatively with one another (see figure 1). But Shinohara et al. do not disclose the arbitration information management section further has a function of managing the bus master arbitration information and the bus arbitration information so as to reflect group information that contains a requested resource access bandwidth for each bus master in each group. However Satoh et al. disclose the arbitration information management section further has a function of managing the bus master arbitration information and the bus arbitration information so as to reflect group information that contains a requested resource access bandwidth for each bus master in each group (see col. 9, line 57 through col. 10, line 56). Therefore, it would have been

obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

In regard to claim 12, Satoh et al. disclose further comprising a simulation section for simulating an operation of the data processing system so as to produce group information that stores grouping information of the plurality of bus masters and access permission percentage information indicating a percentage of access to the shared resource granted to the bus masters of each group (see col. 9, line 57 through col. 10, line 56). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

In regard to claim 15, Satoh et al. disclose further comprising a learning section for, after the arbitration information management section initializes the bus arbitration information, obtaining arbitration results information for a predetermined number of arbitration operations by the bus arbitration section, analyzing a status of access to the shared resource based on the arbitration results information, and instructing the arbitration information management section to update the bus arbitration information so as to reduce a latency in accessing the shared resource based on the analysis (see col. 9, line 57 through col. 10, line 56). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

In regard to claim 16, Shinohara et al. disclose wherein: a plurality of bus masters are connected to at least one of the plurality of buses, and the at least one bus includes a bus master arbitration section for arbitrating bus requests from the plurality of bus masters (see figure 1). But Shinohara et al. do not disclose the arbitration information management section further has a function of managing bus master arbitration information for an arbitration operation by the bus master arbitration section; and the learning section further has a function of, after the arbitration information management section initializes the bus master arbitration information, obtaining arbitration results information for a predetermined number of arbitration operations by the bus master arbitration section, analyzing a status of access to the shared resource from the plurality of bus masters based on the arbitration results information, and instructing the arbitration information management section to update the bus master arbitration information so as to reduce a latency in accessing the shared resource based on the analysis. However Satoh et al. disclose the arbitration information management section further has a function of managing bus master arbitration information for an arbitration operation by the bus master arbitration section; and the learning section further has a function of, after the arbitration information management section initializes the bus master arbitration information, obtaining arbitration results information for a predetermined number of arbitration operations by the bus master arbitration section, analyzing a status of access to the shared resource from the plurality of bus masters based on the arbitration results information, and instructing the arbitration information management section to update the bus master arbitration information so as to reduce a latency in accessing the shared resource based on the analysis (see col. 9, line 57 through col. 10, line 56). Therefore, it would have been obvious to a



person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

In regard to claim 18, Satoh et al. disclose wherein the learning section has a function of instructing the arbitration information management section to select one set of bus arbitration information that minimizes an average latency among the plurality of buses, after trying a plurality of sets of bus arbitration information (see col. 9, line 57 through col. 10, line 56). Therefore, it would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have combined the teachings of Satoh et al. within the system of Shinohara et al. because it would reduce traffic load on each bus and increase the system performance.

***Allowable Subject Matter***

6. Claim 19-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is an Examiner's statement of reasons for the indication of allowable subject matter: Claims 19-22 are allowable over the prior art of record because the Examiner found neither prior art cited in its entirety, nor based on the prior art, found any motivation to combine any of the said prior arts which teach wherein the learning section has a function of, if a predetermined number or more of consecutive access requests are issued from one of the plurality of buses within the predetermined number of arbitration operations, instructing the arbitration information management section to update the bus arbitration information so as to

accommodate the consecutive access requests (claim 19); wherein the learning section has a function of, if a predetermined number or more of periodic access requests are issued from the plurality of buses within the predetermined number of arbitration operations, instructing the arbitration information management section to update the bus arbitration information so as to accommodate the periodic access requests (claim 20); wherein the learning section has a function of, if one of the plurality of buses gains access for a predetermined number or more of consecutive times within the predetermined number of arbitration operations, instructing the arbitration information management section to temporarily lower a priority order of the bus (claim 21); wherein the learning section has a function of, after the predetermined number of arbitration operations are performed based only on the bus priority order, setting the highest access priority pattern so that the highest access priority pattern matches with an order in which the buses gained access in the predetermined number of arbitration operations (claim 22).

### *Conclusion*

8. Claims 1-18, 23 are rejected. Claims 19-22 are objected.
9. The prior arts made of record and not relied upon are considered pertinent to applicant's disclosure.

**Crews et al. (US No. 5,619,661)** disclose a dynamic arbitration system and method.

**Cohen et al. (US No. 6,073,199)** disclose a history-based bus arbitration with hidden re-arbitration during wait cycles.

**Kusaka (US No. 6,523,077)** discloses a data processing apparatus and data processing method accessing a plurality of memories in parallel.

**Ogilvie (US No. 6,138,200)** discloses a system for allocating bus bandwidth by assigning priority for each bus duration time slot to application using bus frame and bus duration.

**Moss (US No. 6,892,289)** discloses methods and structure for using memory model for efficient arbitration.

**LaBerge (US No. 6,910,088)** discloses a bus arbitration using monitored windows of time.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Raymond Phan, whose telephone number is (571) 272-3630. The examiner can normally be reached on Monday-Friday from 6:30AM- 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Primary, Paul Myers can be reached on (571) 272-3639 or via e-mail addressed to paul.myers@uspto.gov. The fax phone number for this Group is (571) 273-8300.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [raymond.phan@uspto.gov].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see [hop://pair-direct.uspto.gov](http://pair-direct.uspto.gov). Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 central telephone number is (571) 272-2100.

RR

*Raymond Phan*  
Sept 30, 2005

*Paul R. Myers*  
**PAUL R. MYERS**  
**PRIMARY EXAMINER**